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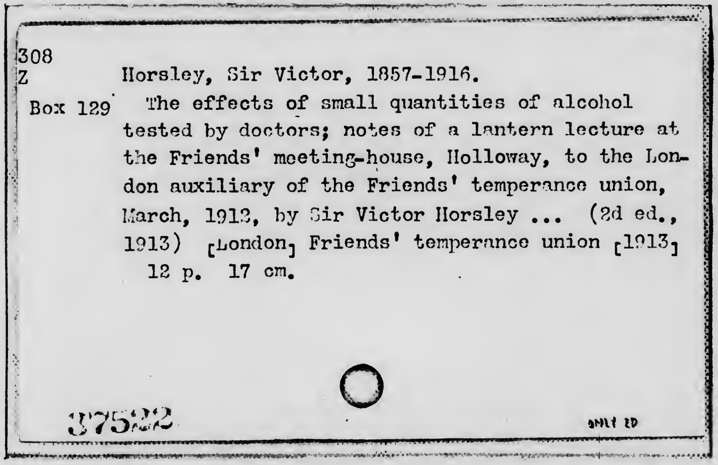

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The Effects of Small Quantities of Alcohol Tested by Doctors.

Sir Victor Horsley, F.R.S., F.R.C.S.

THE EFFECTS OF SMALL QUANTITIES OF ALCOHOL TESTED BY DOCTORS.

Notes of a Lantern Lecture at the Friends'
Meeting-house, Holloway, to the London
Auxiliary of the Friends' Temperance Union,
March, 1912.

BY

SIR VICTOR HORSLEY, F.R.S., F.R.C.S.

(Second Edition, 1913).

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The Effects of Small Quantities of Alcohol Tested by Doctors.

I WISH to speak to-night, not of the every-day evils of drunkenness, but to show that we ought to fight on behalf of total abstinence from the point of view of what is best for the human race, and what is best, of course, for our people especially. It is no true patriotism which does not seek to do all it can for the benefit of the people. Patriotism does not consist in marching about with flags and firing off guns, but in working for the people; and if we work for total abstinence we are working for the people. If scientific investigation shows that even small quantities of drink produce a harmful effect upon our bodies, it is clear that total abstinence and prohibition must be our aim. That is my object to-night.

ALCOHOL AND VEGETABLE GROWTH.

A very remarkable comparison of the effect of alcohol upon the growth of cress seeds may be shown in the following way:—In a row of small jars in which sterilised earth is placed, scatter seeds of cress. In one jar water these with pure water; in the next with tea from the breakfast table, and in these two cases you will see the cress growing almost equally well. In the next, use coffee, and you will find the growth is less satisfactory. In another, water the cress with water contained one drop of alcohol to 100 of water, and you will find no growth takes place. Water the last jar with "ordinary mixture," that is, a glass of brandy and water, and there also there will be no growth at all.

Of course, we know that the infusions, the decoctions, which we call tea and coffee respectively contain a great many things which would have an injurious effect upon the cress; but there will be nevertheless very free growth, while all growth is stopped by a ridiculously small quantity of alcohol. The seeds in the last jar (with the glass of brandy and water) would be killed outright; but the seeds which had not sprouted—having been watered with the one drop in a hundred—take out and wash with water and then set them again, and they may recover. In some cases you will see them throwing out a rootlet; but very remarkably the rootlet instead of growing down into the earth as any respectable rootlet would do, will grow horizontally. It will show no tendency to go down; it may grow a little in the opposite direction. In other words the rootlet, of course, is intoxicated; it has lost the natural tendency to grow into the earth, to grow downwards, what is called geotropism, as a matter of fact. This effect is not peculiar to alcohol. A colleague of mine made similar experiments with drugs such as chloroform and ether, and he found that these also will prevent a rootlet from doing what it ought to do, will lead it aside, astray, so that it never grows into the earth. As alcohol perverts the natural tendency of the body, so it perverts the natural tendencies of the seed, and in the next stage it paralyses it.

People constantly tell you, "Alcohol has no effect on me, I can drink several glasses of wine for dinner, and I am the same after." I am not now going into the question whether a person is absolutely the same next day. A great many experiments show he is *not*. Even these simple seeds show that the alcohol produces a lasting injurious effect on the seed, and that it perverts its nature, its natural function.

ALCOHOL AND THE BLOOD.

We are, however, much more interested in our own bodies than in seeds, and it is about our bodies that I want to speak chiefly. You know what blood looks like. It is a watery red fluid flowing through our arteries and veins. But it is a *living* fluid, more than a simple mixture of water and corpuscles. Owing to its living power, it can fight against microbes—the germs of disease—which enter our body. We absorb the microbes or germs into our blood, they are then scattered over the body and destroy the tissues if the blood is not pure enough to resist. A great deal of work has been done on this subject in recent years, revealing some very interesting facts, but above all, in relation to alcohol. This new work, revealing to us the way in which the blood fights against disease, is the most delicate way in which we can test the influence on the body of a poisonous drug like alcohol.

THE RED AND WHITE CORPUSCLES.

It is possible to see in a photograph a thin layer of blood, enormously magnified. It will show you that blood consists of liquid; and contains discs, which are red corpuscles, of which there are a great number; also a few of a totally different structure, consisting of what we call "protoplasm," that is, a living tissue with a nucleus. These white corpuscles are the most active corpuscles of the blood, seizing the microbes when they get into the blood. The duty of the red corpuscles is to carry to the tissues the oxygen of the air we breathe. If we take into our body any poisonous substance like alcohol, it has an injurious effect on the colouring matter of the corpuscle, diminishing that oxygen-carrying property. If we do not take in enough fresh air, our tissues cannot resist disease very well.

THE WHITE CORPUSCLES AND THE BACILLI.

The microscope again will show the microbes, or bacilli of consumption floating about in the liquid part of the blood. These do not enter the red corpuscles but the white corpuscles have the power of taking them up. These white corpuscles are always on the look-out, as it were, to protect us against microbes, catching them directly they get into the blood.

PARALYSING OUR PROTECTORS.

The effect of alcohol on the white corpuscles is still more important than its effect on the red. Just as alcohol paralyses the seeds of plants, so it paralyses the white corpuscles and prevents them from taking up the microbes. Thus a small quantity of alcohol may render our blood no longer capable of fighting against infectious disease, because our corpuscles cannot do their work.

ALCOHOL AND ERYSIPELAS.

And what about the liquid part of the blood, which is living just as are the white corpuscles? Of recent years it has been discovered that this part of the blood contains a chemical substance which helps us in the fight against microbes, and if that chemical substance is not present we fall a victim to infectious disease. The liquid part of the blood is very sensitive, and there are a good many drugs which will injure this property and destroy it. One among

them is alcohol, a fact well-known in hospital work. The disease called erysipelas is caused by a very small microbe, which grows in chains all through the tissues and through the blood, but preferring to grow in the tissues away from the blood. It sets up a violent inflammation, and is a very fatal disease, especially in old people. For many years, I suppose eighty or a hundred, it was a well-recognised fact in the hospitals that if a brewer's man came into the hospital with a slight wound, he was very likely to get erysipelas. About twenty years ago two American physicians made some experiments on rabbits and they found that if those animals—which are just as sensitive to the attack of this germ—were given a small quantity of alcohol they died more rapidly. In the old days the idea was to give people alcohol to resist the microbes. This was the very worst thing that could be done, because a small quantity of alcohol destroys that chemical substance which enables us to fight the germs.

ALCOHOL AND TYPHOID.

Having now seen this very striking instance of the fact that alcohol does diminish our power of fighting against an infectious disease like erysipelas, let us take another example, namely, typhoid fever. You all know this infectious disease by reputation. In a very short time fortunately, you won't know anything about it, because in a very few years typhoid fever will be extinguished. The death-rate from typhoid has fallen 70 per cent. in the last ten years; it is now down to only 4 per 1,000, and the reason for this is that we now know the bacillus that causes typhoid fever.

Professor Laitinen, a Finn, has conducted a series of elaborate experiments, which show the harmful effect of alcohol upon the blood. The value of these is greatly enhanced because of the large number of animals and persons upon whom he experimented—some hundreds of animals, and 223 human beings. And some of these experiments tested the effect of alcohol upon the power of the blood to resist the bacillus of typhoid fever. This bacillus, of course, like many other microbes, will grow in a broth, or in gelatine. Now, if you add to that broth or gelatine a small amount of human blood—supposing you prick you finger and just draw from it a small amount of blood and mix it in the broth or gelatine, and then put some typhoid bacilli into it, before long little colonies of these bacilli will be developed. But Professor Laitinen found that in the case of an abstainer these bacilli were decidedly fewer than in the case of a person who is in the habit of taking alcohol. You may say, "Oh yes, but you mean a 'drunken' person." I don't mean anything of the sort. Taking people who only drank a glass a day, he found that their blood had not the same power of frustrating the growth of typhoid fever as had the blood of teetotalers. Of course, the discovery of this fact was really led up to by a number of his other experiments; but of all delicate methods there is certainly nothing to equal these chemical tests by the blood. After Laitinen therefore had investigated this question as to typhoid fever bacillus, it occurred to him to see whether the red corpuscles in the blood of an ordinary person who drank his glass of beer a day had the same properties as the red corpuscles in the blood of teetotalers; with this remarkable result,—he found that the red corpuscle of the blood of a person who drank a glass a day more easily broke down, they had not the same vitality as the red corpuscles of a teetotaler.

ALCOHOL AND OFFSPRING.

If, then, you have got a small quantity of alcohol circulating in the blood (over which, remember, it has abounding effect), the tissues of the body are greatly affected by it. It is popularly recognised that the offspring of people who take a considerable amount of alcohol are very liable to be degenerate. This raises the great question as to whether alcohol *does* affect offspring. As you know, violent controversy has recently taken place on this subject, carried on between Miss Elderton and Professor Karl Pearson, and myself. I am not going into that, but should like to say that Professor Pearson and Miss Elderton have never answered Dr. Sturge's and my papers in any journal where they could be criticised by the medical profession. I understand that they have answered it in a pamphlet, but not in the light of day.

Let us now take up this question of small quantities of alcohol in regard to offspring, because it is a thing that can be investigated experimentally with the utmost ease. You have only to give an animal a quantity of alcohol so small as to correspond pound for pound, with the amount of alcohol taken in a glass of beer by an average-sized man. In Laitinen's experiments on animals the dose given in water each day amounted to only one cubic centimetre for each kilogramme the animal weighed.* If you give that to a pair of rabbits day after day for months, and then compare the family of these rabbits with the family of rabbits which have had no alcohol in their water, you then discover facts of which you can realise the magnitude. A rabbit begins, of course, like all animals, from an ovum or egg, and the ovum of the rabbit at one stage is nothing but a formless mass of protoplasm very like the white corpuscle of the blood. Outside that we have cells, also protoplasm, whose duty it is to nourish the ovum. The blood comes into the spaces between

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*** Twenty-eight and a half cubic centimetres (or grammes) equal an ounce. A kilogramme is 2 1-5th lbs.**

the cells, and the excessively small quantity mentioned above affects these cells, and that affects the ovum.

Laitinen also found that the rabbits that had this excessively small quantity of alcohol had a much larger quantity (7 per cent.) of offspring born dead (or only surviving for a very short time) than had the rabbits which had been given water only. So this exceedingly small quantity of alcohol had considerably lessened the parental powers. He next tried the same experiment on guinea-pigs. The guinea-pig is a remarkable animal, because in some ways it is very hardy, and it has some special powers of resistance against certain microbes, and one might have expected that it would have very considerable powers of resisting a drug like alcohol. Not at all! In the case of guinea-pigs the mortality before the fourth day after birth was still greater; 36 out of every 100 of the offspring of the alcohol animals died, as against 21 of the offspring of those who had no alcohol.

More experiments of this kind were made in America by Professor Hodge with dogs. Two dogs, dog and bitch, had no alcohol; two others had alcohol, about the same quantity proportionately as people would take at dinner. Of course, they were all in perfect health. He made these four dogs the subject of very interesting observations. For instance, he took them into a large room and had them drawn up at one end, and then threw balls for them to run after and get; he found the teetotal dogs were able to pick up something like twice as many balls as the alcoholic dogs. I am not concerned with their efficiency in this way, but with their powers as parents in having healthy offspring. [Sir Victor Horsley showed diagrammatically that in the families of the alcoholic parents not only were a greater number born dead, but a very high percentage of the

surviviors were deformed or in some other way abnormal.]

FEEBLE-MINDEDNESS IN CHILDREN.

I want to refer to one point in particular. Dr. Potts, of Birmingham, clearly shows that the existence of feeble-mindedness in children is to a very large extent due to alcoholism in the parents. Now our brain is a collection of little objects which we call nerve corpuscles, which are united by fibres. The brain is practically an arrangement of stations connected together by wires. At the top are the fibres which are most important for our highest thoughts and highest mental work. They are what are called association fibres, and because they run flat on the brain, they are called tangential. Professor Hodge found that the most striking point in the puppies that were born of the alcoholic parents was that their brains were not properly furnished with these fibres. In other words, if those puppies had lived, they would have qualified as feeble-minded puppies. This result was wholly unlooked for, and when Professor Hodge first made the observations it was not understood any more than those with regard to erysipelas had been understood. The deduction is to show absolutely that small quantities of alcohol have a deleterious effect upon offspring, because small quantities of alcohol have a deleterious effect on the blood.

OVERLAYING OF CHILDREN.

Passing to another point, people often say of friends, "Oh, they don't drink, but they take more than is good for them." I want to show you another of the effects of alcohol. One of the Coroners in London who died recently (Mr. Troutbeck) spent a great deal of his time in Court trying to show that one of the causes of infant mortality and the death-rate among children in London was not alcohol. I want to show that it *is*. I refer to the question of overlaying of children, which is usually due to the fact that the parent has gone to bed, not necessarily drunk, but with a certain amount of alcohol, which has been sufficient to make the brain so profoundly asleep that she has overlaid and smothered the child. This is an extremely important matter, because so many cases of overlaying occur in a big city. [The lecturer exhibited a chart with columns representing the days in the week, and a dotted line representing the number of cases of drunkenness daily in Liverpool.] You see a certain number of cases on Monday, less on Tuesday, and the lowest drunken day in Liverpool is Thursday; it begins to pick up again on Friday, and then, of course, on Saturday—pay day—there is an enormous quantity of cases of drunkenness. This black line represents the cases of overlaying of children; you see a few cases on Monday, fewer still in the middle of the week, and then on Saturday night the most—proving that this social evil is due to alcohol.

[In the latter part of his lecture Sir Victor Horsley exhibited charts illustrating the prevalence of the drink trade, the drink shops indicated by means of black spots. Parts of Cardiff, Marylebone, North Islington, Birmingham, were thus outlined, showing the density of licensed houses in the poorest quarters and along the main road arteries, while in the better streets and districts their numbers are few.] "On the whole in North Islington there are very few public-houses in comparison with Marylebone; yet in North Islington £1,000 a day is spent on drink. And what for? Simply to reduce the white part of our blood, and to make us more prone to disease and to cause the degeneration of our children.

If we are to keep in the van of civilisation, total abstinence must be our abiding principle.

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